



Electrical Engineering Technology Program Standard

The approved program standard for the Electrical Engineering Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology. (MCURES funding code 65613)

Ministry of College, Universities, Research Excellence and Security
January 2026

Acknowledgements

The Ministry of College, Universities, Research Excellence and Security acknowledges with thanks the significant contribution of the many individuals and organizations which participated in the development of this program standard. In particular, the Ministry of College, Universities, Research Excellence and Security would like to acknowledge the important roles of:

- all individuals and organizations which participated in the consultations
- the faculty, coordinators and deans of the Electrical Engineering Technology (Ontario College Advanced Diploma) program for their assistance throughout the project
- Vertha Coligan, the Project Officer who led the English review
- Isabel Bellon, the Project Officer who led the French review

Contents

Introduction	1
Development of system-wide program standards	1
Program standards	1
The expression of program standards as vocational learning outcomes	2
The presentation of the vocational learning outcomes	2
The development of a program standard	2
Updating the program standard	3
Vocational standard	4
Preamble	4
The vocational learning outcomes	7
Glossary	20
Essential employability skills	24
Context	24
Skill categories	24
Application and implementation	25
General education requirement	28
Requirement	28
Purpose	28
Themes	28

Introduction

This document is the Program Standard for the Electrical Engineering Technology program of instruction leading to an Ontario College Advanced Diploma delivered by Ontario Colleges of Applied Arts and Technology (MCURES funding code 65613).

Development of system-wide program standards

In 1993, the Government of Ontario initiated program standards development with the objectives of bringing a greater degree of consistency to college programming offered across the province, broadening the focus of college programs to ensure graduates have the skills to be flexible and to continue to learn and adapt, and providing public accountability for the quality and relevance of college programs.

The Program Standards Unit of the Ministry of College, Universities, Research Excellence and Security has responsibility for the development, review and approval of system-wide standards for programs of instruction at Ontario Colleges of Applied Arts and Technology.

Program standards

Program standards apply to all similar programs of instruction offered by Colleges of Applied Arts and Technology across the province of Ontario. Each program standard for a postsecondary program includes the following elements:

- [Vocational standard](#) (the vocationally specific learning outcomes which apply to the program of instruction in question),
- [Essential employability skills](#) (the essential employability skills learning outcomes which apply to all programs of instruction); and
- [General education requirement](#) (the requirement for general education in postsecondary programs of instruction).

Collectively, these elements outline the essential skills and knowledge that a student must reliably demonstrate in order to graduate from the program.

Individual Colleges of Applied Arts and Technology offering the program of instruction determine the specific program structure, delivery methods and other curriculum matters to be used in assisting students to achieve the outcomes articulated in the standard. Individual colleges also determine whether additional local learning outcomes will be required to reflect specific local needs and/or interests.

The expression of program standards as vocational learning outcomes

Vocational learning outcomes represent culminating demonstrations of learning and achievement. They are not simply a listing of discrete skills, nor broad statements of knowledge and comprehension. In addition, vocational learning outcomes are interrelated and cannot be viewed in isolation from one another. As such, they should be viewed as a comprehensive whole. They describe performances that demonstrate that significant integrated learning by graduates of the program has been achieved and verified.

Expressing standards as vocational learning outcomes ensures consistency in the outcomes for program graduates, while leaving to the discretion of individual colleges, curriculum matters such as the specific program structure and delivery methods.

The presentation of the vocational learning outcomes

The **vocational learning outcome** statements set out the culminating demonstration of learning and achievement that the student must reliably demonstrate before graduation.

The **elements of the performance** for each outcome define and clarify the level and quality of performance necessary to meet the requirements of the vocational learning outcome. However, it is the performance of the vocational learning outcome itself on which students are evaluated. The elements of performance are indicators of the means by which the student may proceed to satisfactory performance of the vocational learning outcome. The elements of performance do not stand alone but rather in reference to the vocational learning outcome of which they form a part.

The development of a program standard

In establishing the standards development initiative, the Government of Ontario determined that all postsecondary programs of instruction should include vocational skills coupled with a broader set of essential skills. This combination is considered critical to ensuring that college graduates have the skills required to be successful both upon graduation from the college program and throughout their working and personal lives.

A program standard is developed through a broad consultation process involving a range of stakeholders with a direct interest in the program area, including employers, professional associations, universities, secondary schools and program graduates working in the field, in addition to students, faculty and administrators at the colleges themselves. It represents a consensus of participating stakeholders on the essential learning that all program graduates should have achieved.

Updating the program standard

The Ministry of College, Universities, Research Excellence and Security will undertake regular reviews of the vocational learning outcomes for this program to ensure that the Electrical Engineering Technology Program Standard remains appropriate and relevant to the needs of students and employers across the Province of Ontario. To confirm that this document is the most up-to-date release, please contact the [Ministry of College, Universities, Research Excellence and Security](#).

Vocational standard

All graduates of the Electrical Engineering Technology program have achieved the [twelve vocational learning outcomes \(VLOs\)](#), in addition to achieving the essential employability outcomes and meeting the general education (GE) requirement.

Preamble

The Electrical Engineering Technology program provides graduates with advanced theoretical knowledge and practical expertise required to design, analyze, adapt, troubleshoot, commission, and maintain electrical and electronic systems across various industries. Graduates develop strong technical competencies in power systems, automation, control systems, industrial telecommunications, and electrical design, enabling them to contribute effectively to electrical engineering projects under the supervision of a qualified professional.

This program ensures that graduates achieve vocational learning outcomes that reflect current industry standards, regulatory requirements, and technological advancements. The vocational learning outcomes and their respective elements of performance define the core competencies required for success as entry-level electrical engineering technologists.

Throughout the program, students gain hands-on experience in electrical and electronic design, testing, **troubleshooting**, and **commissioning**, while also developing proficiency in **quality assurance**, project management, technical documentation, and compliance with safety codes and standards. Graduates are prepared to work with computer applications, automation software, data acquisition systems, and control technologies, ensuring their ability to support complex electrical engineering functions in modern workplaces.

Upon completion, graduates may pursue entry-level employment in a wide range of industries, including power generation, transmission, and distribution; electrical maintenance and installation; industrial automation and robotics; telecommunications; renewable energy systems; and engineering consulting. In these roles, technologists assist in design, analysis, testing, **commissioning**, and optimization of electrical and electronic systems, ensuring compliance with industry best practices and safety regulations. While graduates may initially work under supervision, they will progressively gain independence and responsibility as they develop experience and expertise.

For those seeking career advancement, opportunities exist for further education, industry certifications, or apprenticeship training in specialized fields such as renewable energy, power systems engineering, smart grid technologies, and industrial automation. Graduates may also be eligible for credit transfer or advanced standing in baccalaureate programs or industry certifications through articulation agreements between colleges, universities, and professional organizations.

This program standard establishes a comprehensive framework of skills, knowledge, and professional attitudes essential for entry-level electrical engineering technologists. While this standard provides a broad foundation, individual colleges may offer specialized pathways tailored to emerging industry needs. Students are encouraged to explore articulation agreements, apprenticeship options, and professional certifications available at their chosen institution.

By integrating theory, hands-on learning, problem-solving, and compliance with evolving industry regulations, the Electrical Engineering Technology program ensures graduates are well-prepared to contribute effectively to electrical and engineering environments, while establishing a strong foundation for lifelong learning and professional growth.

[See Glossary](#)

Note: The [Ontario Council on Articulation and Transfer](#) (ONCAT) maintains the provincial postsecondary credit transfer portal, [ONTransfer](#).

Synopsis of the vocational learning outcomes Electrical Engineering Technology (Ontario College Advanced Diploma)

The graduate has reliably demonstrated the ability to:

1. Perform duties as directed and within the scope of practice.
2. Analyze, produce, and maintain electrical and electronic drawings and records to ensure the integrity of the information and workflow control.
3. Evaluate and troubleshoot complex malfunctions and performance issues in electrical systems to ensure reliable operation in compliance with industry standards.
4. Design, install, program, analyze, and troubleshoot **instrumentation** equipment and control systems in accordance with manufacturer's recommendations.
5. Design, assemble, test, verify, maintain, and commission, electrical and electronic, circuits and components according to project specifications.
6. Test, troubleshoot, optimize, and commission electromagnetic machines and power systems to maintain operational integrity and safety.
7. Develop, implement, and improve **quality assurance** or control procedures for electrical systems and components to enhance reliability and compliance.
8. Configure, install, and apply electrical cabling, **grounding**, and **bonding** requirements for various applications to ensure safe and compliant system operation.
9. Comply with, monitor, assess, and improve workplace health and safety compliance with industry regulations and organizational policies.
10. Test, troubleshoot, optimize, and commission communication systems to maintain operational integrity and safety.
11. Ensure compliance with relevant legislation, industry standards, and ethical principles to support safety, efficiency, and sustainability in the electrical workplace.
12. Plan, implement and evaluate requirements to carry out and meet electrical projects' deliverables accurately, on time and on budget.

[See Glossary](#)

Note: The learning outcomes have been numbered as a point of reference; numbering does not imply prioritization, sequencing, nor weighting of significance.

The vocational learning outcomes

1. The graduate has consistently demonstrated the ability to: perform duties as directed and within scope of practice.

Elements of the performance

- a. Execute tasks independently while ensuring full compliance with workplace regulations, industry standards, and ethical principles.
- b. Assess task requirements and determine the most effective approach to meet project objectives.
- c. Identify and mitigate potential risks in workplace procedures and project execution.
- d. Interpret and apply complex industry regulations and best practices to optimize performance and efficiency.
- e. Provide guidance or mentorship to junior staff or colleagues within the defined scope of practice.
- f. Contribute to process improvements and operational efficiencies within the workplace.

[See Glossary](#)

2. The graduate has consistently demonstrated the ability to analyze, produce and maintain electrical and electronic drawings and records to ensure the integrity of the information and workflow control.

Elements of the performance

- a. Use advanced computer software and technology, such as CAD tools, to produce, reproduce, and modify drawings, sketches, diagrams, charts, tables, and graphs.
- b. Apply relevant codes, standards, and symbols to ensure the accuracy and compliance of drawings.
- c. Analyze and interpret single-line diagrams, schematics, and 3D assembly drawings to convey detailed technical data.
- d. Prepare and modify electrical specifications, project-related documents, and circuit diagrams for advanced applications.
- e. Plan, prepare, and organize comprehensive technical reports, including documentation related to system design, testing, **commissioning**, modifications, and implementation, while ensuring compliance with applicable standards.
- f. Deliver technical presentations that summarize project findings, data, and recommendations effectively.
- g. Use electronic systems to store, retrieve, and organize technical information.
- h. Maintain rigorous, accurate, and up-to-date technical documentation that meets electrical standards and industry requirements.
- i. Develop equipment lists, bills of material, and project-specific documents to support design and implementation activities.
- j. Ensure all documentation aligns with organizational and industry standards to support advanced technical applications.
- k. Document and communicate the design, **commissioning**, testing, and modification of electrical and electronic systems to ensure traceability and compliance.
- l. Collaborate with team members to ensure technical data is accurate, accessible, and aligned with project requirements.

[See Glossary](#)

3. The graduate has consistently demonstrated the ability to: evaluate and troubleshoot complex malfunctions and performance issues in electrical systems to ensure reliable operation in compliance with industry standards.

Elements of the performance

- a. Use advanced mathematical concepts, including differential calculus, algebra, and trigonometry, to analyze and troubleshoot complex electrical systems.
- b. Apply Laplace Transform, Z Transform, Fourier Transform, and their applications to circuit analysis, behavior, and design.
- c. Utilize statistical measures and graphical representations to analyze experimental data and evaluate system performance.
- d. Develop mathematical and graphical models to test alternatives and determine optimal solutions for system inefficiencies.
- e. Diagnose failures and inefficiencies in electrical circuits, equipment, systems, and subsystems using advanced diagnostic techniques.
- f. Evaluate and quantify complex technical problems, identify root causes, and propose alternative solutions.
- g. Perform conversions among number systems such as hexadecimal, decimal, octal, binary, Boolean, and binary-coded decimal when diagnosing digital systems.
- h. Select, install, and use industry-standard software to analyze and troubleshoot electrical systems.
- i. Simulate and test electrical circuits using software tools to evaluate performance and predict potential issues.
- j. Use computer programming languages to develop custom solutions for analyzing and resolving complex engineering problems.
- k. Combine control and data collection hardware with software to monitor and control electrical components and systems.
- l. Create, test, and document electrical and electronic circuits using simulation and design software.
- m. Utilize online resources such as reference manuals, handbooks, knowledge bases, and technical databases to support **troubleshooting** and design efforts.
- n. Share insights and findings with team members to enhance collaborative problem-solving.
- o. Maintain clear and detailed records of diagnostic processes, system evaluations, and **troubleshooting** outcomes.
- p. Prepare and present technical reports that summarize findings, recommendations, and system improvements.
- q. Analyze power quality disturbances, including harmonics, transients, voltage sag/swell, and power factor issues.
- r. Use advanced power quality analyzers and simulation software to diagnose and mitigate electrical system inefficiencies.
- s. Apply high-efficiency switching power electronics to optimize power conversion and minimize energy loss.
- t. Evaluate and resolve grid voltage instabilities, ensuring compliance with smart grid reliability standards.

[See Glossary](#)

4. The graduate has consistently demonstrated the ability to: design, install, program, analyze, and troubleshoot equipment and control systems in accordance with manufacturer's recommendations.

Elements of the performance

- a. Design and adapt systems for measuring and telemetering physical quantities such as pressure, temperature, and flow, for use in process control systems.
- b. Apply principles of **instrumentation** to design or adapt measurement systems using available components for specific applications.
- c. Develop and implement **instrumentation** systems for testing and evaluating power transformers and other equipment.
- d. Select and operate **instrumentation** equipment such as signal generators, frequency counters, oscilloscopes, multimeters, and computerized test equipment.
- e. Perform precise measurements of power, voltage, current, resistance, and power quality using appropriate tools and techniques.
- f. Use relay test equipment to verify operating test points and ensure system accuracy.
- g. Use manual and computer-based **instrumentation** to analyze, test, and troubleshoot complex electrical, electronic, and digital circuits.
- h. Troubleshoot and resolve issues in **instrumentation** systems to maintain system accuracy and reliability.
- i. Identify and mitigate hazards when using and maintaining test and **instrumentation** equipment, adhering to safety standards.
- j. Design, install, program and troubleshoot control systems incorporating microprocessors, Programmable Logic Controllers (PLC), **Human machine interfaces** (HMI), and feedback mechanisms.
- k. Install and test semiconductor and electromechanical switching circuits for advanced control applications.
- l. Test, program, and troubleshoot servo drive systems, AC and DC variable speed drive systems, and servomechanism drive systems.
- m. Program and tune open and closed-loop electromechanical control systems for optimal performance.
- n. Analyze and service control systems to adapt them to specific operational requirements.
- o. Document design, testing, and **troubleshooting** activities to maintain clear and accurate records.
- p. Prepare technical reports summarizing findings, system configurations, and recommendations for improvement.
- q. Follow applicable industry standards and safety protocols during the design, installation, and maintenance of **instrumentation** and control systems.
- r. Ensure that all **instrumentation** and control systems meet operational and regulatory requirements.
- s. Integrate and configure smart grid automation systems for enhanced grid stability and energy resilience.

- t. Troubleshoot intelligent energy monitoring and management systems for industrial and commercial applications.
- u. Utilize advanced programmable logic controllers (PLCs), **SCADA** systems, IoT-based smart control systems, robotic technologies, and industrial cybersecurity practices for real-time monitoring and control.
- v. Analyze and improve load balancing and demand response mechanisms to enhance electrical grid efficiency.

[See Glossary](#)

5. The graduate has consistently demonstrated the ability to: design, assemble, test, verify, maintain and commission electrical and electronic, circuits and components according to project specifications.

Elements of the performance

- a. Design and adapt electrical circuits, equipment, and systems to meet functional and operational specifications.
- b. Select, interpret, and apply relevant regulations, codes, and standards to design tasks.
- c. Create and adapt designs for electromechanical devices, automation systems, and control systems.
- d. Determine and recommend appropriate electrical equipment, systems, and components based on specifications and requirements.
- e. Conduct cost-benefit analyses to evaluate and select optimal equipment and components.
- f. Consult manufacturers' specifications, catalogs, data sheets, and online resources to select suitable equipment and components.
- g. Recommend adequate substitutes when necessary to meet design or operational needs.
- h. Assemble, install, and configure industry-specific electrical equipment, including automation and control systems.
- i. Identify and implement wiring requirements for electrical installations, recommending optimal solutions.
- j. Follow Electrostatic Discharge (ESD) procedures to protect sensitive electrical components during assembly and installation.
- k. Conduct tests on electrical equipment, interpret results, and troubleshoot issues as required.
- l. Use standard electrical, electronic, and computer-based test equipment to identify and analyze problems.
- m. Troubleshoot AC and DC networks, including analog, digital, power electronic, and electromechanical devices, at the system level.
- n. Perform preventative maintenance and follow service schedules to ensure system reliability.
- o. Modify and upgrade equipment to meet updated requirements or improve performance.
- p. Apply appropriate techniques to refurbish or repair electrical equipment and systems.
- q. Develop and document procedures for system assembly, testing, **troubleshooting**, and maintenance.
- r. Maintain accurate records of test results, modifications, and maintenance activities for reporting purposes.
- s. Adhere to industry standards, codes, and regulations during all design, installation, testing, and **troubleshooting** activities.
- t. Operate equipment in compliance with manufacturer requirements and safety standards.

- u. Design and test power electronic circuits, including high-efficiency switching regulators, inverters, and rectifiers.
- v. Develop and integrate photovoltaic (PV) power systems into existing electrical grids, ensuring maximum efficiency.
- w. Implement grid-connected and standalone battery energy storage systems (BESS) for industrial and commercial applications.
- x. Optimize the design of renewable energy-based microgrids, ensuring resilience and fault tolerance.

[See Glossary](#)

6. The graduate has consistently demonstrated the ability to: test, troubleshoot, optimize and commission electromagnetic machines and power systems to maintain operational integrity and safety.

Elements of the performance

- a. Select, specify, and install AC and DC machines and associated control systems based on design specifications and regulatory standards.
- b. Assist in the application of electromagnetic machines to meet operational requirements for various environments and loads.
- c. Plan and operate systems that incorporate large electric motors to fulfill specific industrial applications.
- d. Commission electromagnetic machines, including motor drives and control systems, to ensure they meet performance specifications.
- e. Optimize the operation of AC and DC machines by adjusting parameters to achieve maximum efficiency and reliability.
- f. Use techniques such as risk assessments and safe design principles to ensure the safe operation of machines and systems.
- g. Perform testing on AC and DC machines and associated control systems to verify functionality and diagnose faults.
- h. Troubleshoot and resolve issues in motor drives, control systems, and electrical machines to restore optimal performance.
- i. Analyze system faults, instabilities, and harmonics, using advanced diagnostic techniques.
- j. Analyze and maintain generation, transmission, and distribution systems to ensure operational efficiency.
- k. Perform power calculations for single-phase and polyphase systems to address inefficiencies and resolve problems.
- l. Conduct power factor correction calculations to optimize system performance.
- m. Select, install, test, and maintain power, instrument, and control transformers to meet operational and environmental specifications.
- n. Install and maintain protective devices, such as fuses, circuit breakers, instrument transformers, and relays, to safeguard systems against faults.
- o. Produce and interpret electrical drawings, such as single-line diagrams, relaying, and metering schematics, to support **commissioning** and **troubleshooting** activities.
- p. Ensure that all design and installation activities adhere to applicable standards and codes.
- q. Analyze, install, and troubleshoot alternative and sustainable energy generation systems to support energy efficiency and environmental objectives.
- r. Maintain detailed records of **commissioning**, testing, **troubleshooting**, and maintenance activities.
- s. Prepare and communicate reports summarizing findings, optimizations, and recommendations for system improvements.

- t. Perform advanced power quality testing on rotating electrical machines to identify harmonic distortions and transient instabilities.
- u. Implement and maintain battery energy storage solutions for peak shaving, load shifting, and backup power applications.
- v. Evaluate and optimize variable frequency drives (VFDs), motor controllers, and high-efficiency drive systems for industrial automation.
- w. Ensure compliance with grid-interconnection standards for distributed energy resources (DERs), including PV and wind power systems.

[See Glossary](#)

7. The graduate has consistently demonstrated the ability to: develop, implement, and improve **quality assurance** or control procedures for electrical systems and components to enhance reliability and compliance.

Elements of the performance

- a. Review and evaluate specifications for electrical circuits, equipment, and systems to identify quality requirements and opportunities for improvement.
- b. Develop and implement **quality assurance** or control procedures aligned with organizational goals and industry best practices.
- c. Recommend changes to existing **quality assurance** or control procedures to improve effectiveness and address identified gaps.
- d. Use appropriate equipment and tools to conduct **quality assurance** or control testing, ensuring accuracy and reliability of results.
- e. Monitor and analyze test results against predefined specifications, identifying deviations and recommending corrective actions.
- f. Interpret and report findings in a clear and actionable manner, supporting decision-making and process improvements.
- g. Apply knowledge of **quality assurance** or control programs and standards to refine products and processes.
- h. Maintain detailed documentation of **quality assurance** or control activities, test results, and modifications to support compliance and traceability.
- i. Assess the effectiveness of current **quality assurance** or control procedures and propose strategies for continuous improvement.
- j. Evaluate the power efficiency, sustainability, and environmental impact of electrical systems.
- k. Implement ISO 50001-compliant energy management practices for large-scale electrical infrastructure.
- l. Ensure **quality control** for smart grid and automation technologies, including sensor-based fault detection and remote monitoring.
- m. Monitor and verify compliance with IEEE, CSA, and utility regulatory standards for grid-connected renewable energy systems.

[See Glossary](#)

8. The graduate has consistently demonstrated the ability to: configure, install, and apply electrical cabling, **grounding**, and **bonding** requirements for various applications to ensure safe and compliant system operation.

Elements of the performance

- a. Produce, modify, and interpret electrical drawings related to cabling, **grounding**, and **bonding** systems.
- b. Ensure drawings reflect compliance with industry standards, safety regulations, and project specifications.
- c. Configure and install electrical cabling and wiring in accordance with applicable electrical codes and safety standards.
- d. Follow best practices and applicable codes for building electrical systems to ensure safe and efficient operations for various applications.
- e. Apply industry codes, procedures, and processes to test the functionality and effectiveness of system **grounding** and **bonding**.
- f. Verify that **grounding** and **bonding** systems meet operational requirements and safety standards.
- g. Identify and troubleshoot system faults, including instabilities, harmonics, and impedance issues in **grounding** and cabling systems.
- h. Resolve issues to optimize the safety and performance of electrical systems under supervision.
- i. Develop and maintain wire and cable lists and assemblies in compliance with the Electrical Code of the province or country where the equipment is operating.
- j. Ensure documentation is accurate and aligns with project specifications and regulatory requirements.
- k. Adhere to safety regulations and industry standards during the configuration, installation, and testing of cabling, **grounding**, and **bonding** systems.
- l. Follow all applicable legal and safety protocols to protect personnel, equipment, and the environment.
- m. Maintain detailed records of cabling, **grounding**, and **bonding** configurations, including testing results and **troubleshooting** activities.
- n. Communicate findings and recommendations clearly to supervisors and team members.
- o. Design, install, and commission high-voltage cabling solutions for EV charging infrastructure and smart grid interconnections.
- p. Implement cabling solutions for smart homes, smart buildings, and industrial automation.
- q. Design and install fiber-optic and broadband communication systems for real-time monitoring of electrical power systems.
- r. Ensure compliance with renewable energy microgrid cabling standards for safe and efficient operation.

9. The graduate has consistently demonstrated the ability to: comply with, monitor, assess and improve workplace health and safety compliance with industry regulations and organizational policies.

Elements of the performance

- a. Recommend, select, and ensure the proper use of PPE and protective clothing, including arc flash protection, to maintain workplace safety.
- b. Monitor compliance with PPE requirements to ensure adherence to health and safety regulations.
- c. Oversee the safe selection, operation, and maintenance of hand and power tools in accordance with safety practices.
- d. Identify and mitigate risks associated with tool usage to prevent workplace accidents.
- e. Interpret and enforce safety codes, organizational policies, and accident prevention procedures in electrical workplaces.
- f. Conduct safety inspections of work environments to identify hazardous conditions and ensure compliance with safety standards.
- g. Apply and recommend procedures for the safe handling, storage, and disposal of hazardous materials in compliance with WHMIS and TDG regulations.
- h. Monitor adherence to hazardous material protocols and propose improvements to minimize risks.
- i. Perform job safety planning and assess risks associated with operating electrical equipment and systems.
- j. Recommend design and procedural changes to enhance workplace safety and mitigate risks.
- k. Ensure compliance with regulatory and licensing requirements during the installation, maintenance, and repair of electrical equipment.
- l. Monitor organizational adherence to industry standards and legal obligations.
- m. Apply and promote workplace best practices, such as maintaining clean, organized, and secure premises.
- n. Evaluate existing safety practices and recommend updates to align with evolving regulations and industry standards.
- o. Maintain detailed records of safety inspections, incidents, and corrective actions.
- p. Communicate health and safety findings, improvements, and compliance requirements to employees and management.
- q. Implement fire suppression and safety protocols for battery energy storage and PV system installations.
- r. Ensure compliance with EV charging station safety regulations for high-power DC fast chargers.
- s. Monitor and mitigate electrical arc flash hazards in renewable energy and smart grid environments.
- t. Establish safety protocols for grid-connected and off-grid energy storage systems.

10. The graduate has consistently demonstrated the ability to: test, troubleshoot, optimize and commission communication systems to maintain operational integrity and safety.

Elements of the performance

- a. Design or adapt communication systems, intercommunication, and data systems, to meet functional and operational requirements.
- b. Evaluate functional requirements for industrial communication systems and develop solutions tailored to specific applications.
- c. Install communication systems, including cabling, hardware, and components, for Local Area Networks (LANs), Wide Area Networks (WANs), and building management systems.
- d. Implement and configure current data communication protocols to ensure compatibility and functionality.
- e. Test and commission communication systems, including computer networking or electronic data processing cabling, optical fiber cabling, and security systems, to verify performance and compliance with specifications.
- f. Verify system functionality through structured testing procedures and ensure readiness for operation.
- g. Identify and resolve issues in communication systems, including emergency, fire alarm, and other security communication systems.
- h. Analyze and troubleshoot cabling and wiring for communication systems to address faults, instabilities, or inefficiencies.
- i. Design, install, and test communication systems in compliance with industry standards, safety codes, and regulatory requirements.
- j. Ensure all work adheres to best practices for system performance, reliability, and safety.
- k. Design and adapt communication systems to support the implementation of current data communication protocols.
- l. Configure and optimize protocols to ensure efficient data transfer and communication between devices.
- m. Maintain clear and accurate records of design, installation, testing, **commissioning**, and **troubleshooting** activities.
- n. Prepare and communicate reports summarizing system performance, issues identified, and corrective actions taken.
- o. Integrate IoT-based smart home automation systems for energy efficiency and demand-side management.
- p. Configure and test fiber-optic and wireless networks for grid monitoring, EV infrastructure, and industrial automation.
- q. Install and troubleshoot real-time power monitoring and smart metering systems for energy efficiency analysis.

- r. Implement and optimize smart home and building automation systems, including intelligent lighting, HVAC controls, and energy dashboards.

[See Glossary](#)

11. The graduate has consistently demonstrated the ability to: ensure compliance with relevant legislation, industry standards, and ethical principles to support safety, efficiency and sustainability in the electrical workplace.

Elements of the performance

- a. Interpret and adhere to project specifications, safety standards, and applicable legislation, including occupational health and safety regulations and labor laws.
- b. Monitor and ensure the appropriate use of equipment, materials, and tools to comply with industry standards, organizational policies, and legal requirements.
- c. Apply legal principles when preparing contracts or agreements, ensuring compliance with relevant legislation and ethical standards.
- d. Promote adherence to professional codes of ethics as established by governing associations, ensuring integrity in all professional activities.
- e. Incorporate environmentally sustainable practices into projects to minimize ecological and social impacts.
- f. Apply knowledge of collective agreements and workplace rights to ensure fair and equitable treatment of employees and stakeholders.
- g. Communicate compliance requirements and ethical considerations effectively to team members and stakeholders.
- h. Conduct periodic reviews of workplace practices to ensure ongoing compliance with industry regulations, policies, and ethical standards.
- i. Enforce green technology implementation by ensuring adherence to energy efficiency policies and sustainability laws.
- j. Monitor and optimize energy usage and carbon footprint reduction in commercial and industrial electrical installations.
- k. Promote compliance with electrical safety regulations for high-voltage battery storage, smart grid technologies, and EV infrastructure.

12. The graduate has consistently demonstrated the ability to: plan, implement and evaluate requirements to carry out and meet electrical projects' deliverables accurately, on time and on budget.

Elements of the performance

- a. Participate in the planning, scheduling, and assignment of tasks and resources to meet project objectives.
- b. Use project planning tools, such as Gantt Charts, Critical Path Analysis, and PERT Charts, to organize and prioritize project activities.
- c. Contribute to the monitoring of resources and expenditures to maintain cost-effectiveness and adherence to project timelines.
- d. Identify potential issues that may impact timelines and recommend corrective actions to minimize delays.
- e. Complete assigned project elements in accordance with the established schedule and project specifications.
- f. Collaborate with team members to ensure tasks are completed efficiently and effectively.
- g. Assist in the evaluation of project processes to identify successes, challenges, and areas for improvement.
- h. Contribute to the analysis of project outcomes to ensure alignment with project goals and industry standards.
- i. Maintain current, clear, and accurate project-related documents, adhering to organizational and industry standards.
- j. Consolidate and report project updates regularly to keep stakeholders informed of progress.
- k. Use project management software to track project progress, manage tasks, and monitor resources.
- l. Analyze project data to provide insights into resource allocation, timelines, and potential risks.
- m. Ensure project activities and deliverables align with industry standards, organizational policies, and project goals.
- n. Adhere to safety regulations and **quality assurance** or control principles throughout the project lifecycle.
- o. Manage the implementation of EV infrastructure deployment projects, including charging stations and energy storage integration.
- p. Support the execution of smart grid and renewable energy projects, ensuring compliance with sustainability goals and net-zero objectives.
- q. Oversee microgrid development projects, including energy storage optimization and power distribution planning.
- r. Utilize energy analytics tools and software to track and report on project performance, efficiency, and regulatory compliance.

[See Glossary](#)

Glossary

Bonding: A low-impedance connection between conductive parts to ensure electrical continuity and equalize potential. Often confused with **grounding**.

Commissioning: The formal process of verifying, testing, adjusting, and documenting that electrical systems meet design specifications and operate as intended.

Grounding: The connection of an electrical system to the earth to prevent electric shock hazards and stabilize voltage.

Human-machine-interface (HMI): A digital or physical interface that enables users to interact with control systems, such as touchscreens or keypads.

Instrumentation: Devices and systems used to measure, monitor, or control physical and electrical parameters (e.g., voltage, current, pressure, temperature).

Quality assurance: Planned and systematic activities within a quality system that provide confidence a product or service will meet specified requirements.

Quality control: Operational techniques and activities used to fulfill quality requirements, such as inspection and testing.

SCADA (Supervisory Control and Data Acquisition): A control system that enables real-time data collection and process control across distributed electrical systems.

Troubleshooting: The process of diagnosing and resolving faults or malfunctions in electrical systems, equipment, or circuits.

Essential employability skills

All graduates of the Electrical Engineering Technology program of instruction must have reliably demonstrated the essential employability skills learning outcomes listed below, in addition to achieving the [vocational learning outcomes](#) and meeting the [general education requirement](#).

Context

Essential Employability Skills (EES) are skills that, regardless of a student's program or discipline, are critical for success in the workplace, in day-to-day living and for lifelong learning.

The teaching and attainment of these EES for students in, and graduates from, Ontario's Colleges of Applied Arts and Technology are anchored in a set of three fundamental assumptions:

- these skills are important for every adult to function successfully in society today
- our colleges are well equipped and well positioned to prepare graduates with these skills
- these skills are equally valuable for all graduates, regardless of the level of their credential, whether they pursue a career path, or they pursue further education

Skill categories

To capture these skills, the following six categories define the essential areas where graduates must demonstrate skills and knowledge.

- Communication
- Numeracy
- Critical Thinking & Problem Solving
- Information Management
- Interpersonal
- Personal

Application and implementation

In each of the six skill categories, there are a number of defining skills, or sub skills, identified to further articulate the requisite skills identified in the main skill categories. The following chart illustrates the relationship between the skill categories, the defining skills within the categories and learning outcomes to be achieved by graduates from all postsecondary programs of instruction that lead to an Ontario College credential.

EES may be embedded in General Education or vocational courses or developed through discrete courses. However, these skills are developed, all graduates with Ontario College credentials must be able to reliably demonstrate the essential skills required in each of the six categories.

Skill category: communication

Defining skills

Skill areas to be demonstrated by graduates:

- reading
- writing
- speaking
- listening
- presenting
- visual literacy

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. communicate clearly, concisely and correctly in the written, spoken and visual form that fulfills the purpose and meets the needs of the audience.
2. respond to written, spoken or visual messages in a manner that ensures effective communication.

Skill category: numeracy

Defining skills

Skill areas to be demonstrated by graduates:

- understanding and applying mathematical concepts and reasoning
- analyzing and using numerical data
- conceptualizing

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. execute mathematical operations accurately

Skill category: critical thinking and problem solving

Defining skills

Skill areas to be demonstrated by graduates:

- analyzing
- synthesizing
- evaluating
- decision making
- creative and innovative thinking

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. apply a systematic approach to solve problems.
2. use a variety of thinking skills to anticipate and solve problems.

Skill category: information management

Defining skills

Skill areas to be demonstrated by graduates:

- Gathering and managing information
- Selecting and using appropriate tools and technology for a task or a project
- Computer literacy
- Internet skills

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. locate, select, organize and document information using appropriate technology and information systems.
2. analyze, evaluate and apply relevant information from a variety of sources.

Skill category: interpersonal

Defining skills

Skill areas to be demonstrated by graduates:

- Teamwork
- Relationship management
- Conflict resolution
- Leadership
- Networking

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. show respect for the diverse opinions, values, belief systems and contributions of others.
2. interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.

Skill category: personal

Defining skills

Skill areas to be demonstrated by graduates:

- Managing self
- Managing change and being flexible and adaptable
- Engaging in reflective practices
- Demonstrating personal responsibility

Learning outcomes

The graduate has reliably demonstrated the ability to:

1. manage the use of time and other resources to complete projects.
2. take responsibility for one's own actions, decisions and their consequences.

General education requirement

All graduates of the Electrical Engineering Technology program must have met the [general education requirement](#) described below, in addition to achieving the [vocational](#) and [essential employability skills](#) learning outcomes.

Requirement

The [General Education Requirement](#) for programs of instruction is stipulated in the [Credentials Framework](#) in the Minister's Binding Policy Directive Framework for Programs of Instruction.

In programs of instruction leading to either an Ontario College Diploma or an Ontario College Advanced Diploma, it is required that graduates have been engaged in learning that exposes them to at least one discipline outside their main field of study and increases their awareness of the society and culture in which they live and work. This will typically be accomplished by students taking 3 to 5 courses (or the equivalent) designed discretely and separately from vocational learning opportunities.

This general education learning would normally be delivered using a combination of required and elective processes.

Purpose

The purpose of General Education in the Ontario college system is to contribute to the development of citizens who are conscious of the diversity, complexity and richness of the human experience; who are able to establish meaning through this consciousness; and who, as a result, are able to contribute thoughtfully, creatively and positively to the society in which they live and work.

General Education strengthens students' essential employability skills, such as critical analysis, problem solving and communication, in the context of an exploration of topics with broad-based personal and/or societal importance.

Themes

The themes listed below will be used to provide direction to Ontario Colleges in the development and identification of courses that are designed to fulfil the General Education Requirement for programs of instructions.

Each theme provides a statement of Rationale and offers suggestions related to more specific topic areas that could be explored within each area. These suggestions are neither prescriptive nor exhaustive. They are included to provide guidance regarding the

nature and scope of content that would be judged as meeting the intent and overall goals of General Education.

Arts in society:

Rationale:

The capacity of a person to recognize and evaluate artistic and creative achievements is useful in many aspects of his/her life. Since artistic expression is a fundamentally human activity, which both reflects and anticipates developments in the larger culture, its study will enhance the student's cultural and self-awareness.

Content:

Courses in this area should provide students with an understanding of the importance of visual and creative arts in human affairs, of the artist's and writer's perceptions of the world and the means by which those perceptions are translated into the language of literature and artistic expression. They will also provide an appreciation of the aesthetic values used in examining works of art and possibly, a direct experience in expressing perceptions in an artistic medium.

Civic Life:

Rationale:

In order for individuals to live responsibly and to reach their potential as individuals and as citizens of society, they need to understand the patterns of human relationships that underlie the orderly interactions of a society's various structural units. Informed people will have knowledge of the meaning of civic life in relation to diverse communities at the local, national and global level and an awareness of international issues and the effects of these on Canada, as well as Canada's place in the international community.

Content:

Courses in this area should provide students with an understanding of the meaning of freedoms, rights and participation in community and public life, in addition to a working knowledge of the structure and function of various levels of government (municipal, provincial, national) in a Canadian and/or in an international context. They may also provide an historical understanding of major political issues affecting relations between the various levels of government in Canada and their constituents.

Social and cultural understanding:

Rationale:

Knowledge of the patterns and precedents of the past provide the means for a person to gain an awareness of his or her place in contemporary culture and society. In addition to this awareness, students will acquire a sense of the main currents of their culture and that of other cultures over an extended period of time in order to link personal history to the broader study of culture.

Content:

Courses in this area are those that deal broadly with major social and cultural themes. These courses may also stress the nature and validity of historical evidence and the variety of historical interpretation of events. Courses will provide the students with a view and understanding of the impact of cultural, social, ethnic or linguistic characteristics.

Personal understanding:

Rationale:

Educated people are equipped for life-long understanding and development of themselves as integrated physiological and psychological entities. They are aware of the ideal need to be fully functioning persons: mentally, physically, emotionally, socially, spiritually and vocationally.

Content:

Courses in this area will focus on understanding the individual: his or her evolution; situation; relationship with others; place in the environment and universe; achievements and problems; and his or her meaning and purpose. They will also allow students the opportunity to study institutionalized human social behaviour in a systematic way. Courses fulfilling this requirement may be oriented to the study of the individual within a variety of contexts.

Science and technology:

Rationale:

Matter and energy are universal concepts in science, forming a basis for understanding the interactions that occur in living and non-living systems in our universe. Study in this area provides an understanding of the behaviour of matter that provides a foundation for further scientific study and the creation of broader understanding about natural phenomena.

Similarly, the various applications and developments in the area of technology have an increasing impact on all aspects of human endeavour and have numerous social, economic and philosophical implications. For example, the operation of computers to process data at high speed has invoked an interaction between machines and the human mind that is unique in human history. This and other technological developments have a powerful impact on how we deal with many of the complex questions in our society.

Content:

Courses in this area should stress scientific inquiry and deal with basic or fundamental questions of science rather than applied ones. They may be formulated from traditional basic courses in such areas of study as biology, chemistry, physics, astronomy, geology or agriculture. As well, courses related to understanding the role and functions of computers (e.g., data management and information processing) and assorted computer-related technologies should be offered in a non-applied manner to provide students with an opportunity to explore the impact of these concepts and practices on their lives.

Permission to reproduce

Permission is hereby granted to the following institutions to reproduce this document, in whole or in part, in print or by electronic means, for the following specific purposes, subject to the conditions that follow.

1. By an Ontario College of Applied Arts and Technology for the purposes of implementation of the program standard within a college program, including for the purpose of informing students, potential students, program advisory committees or others about programs of study.
2. By an educational institution or school, for the purpose of informing prospective college students about programs of study at Ontario Colleges of Applied Arts and Technology.

Conditions:

1. Every reproduction must be marked “© 2026, King’s Printer for Ontario” at the beginning of the document or any part of it that is reproduced.
2. No other uses may be made of the document.
3. The document may not be reproduced for sale.
4. The ministry may revoke the permission to reproduce at any time.

For permission to copy this document, in whole or in part, for other purposes or by other institutions, please contact:

Ministry of College, Universities, Research Excellence and Security
Postsecondary Education Quality Assessment Branch, Program Standards Unit
315 Front Street West
15th floor
Toronto, Ontario
M7A 0B8

Or by email: psu@ontario.ca

Inquiries regarding specific Electrical Engineering Technology programs offered by Colleges of Applied Arts and Technology in Ontario should be directed to the relevant college.

This publication is available on the [ministry’s website](#).

© 2026, King's Printer for Ontario

978-1-4868-9385-0 PDF